10-19-00

A

Attorney's Docket No. NC30507

Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of
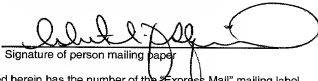
Inventor(s): Leon Thrane

> WARNING: Patent must be applied for in the name(s) of all of the actual inventor(s). 37 CFR 1.41(a) and 1.53(b).

For (title): METHOD AND APPARATUS FOR CONTENT
TRANSFORMATION FOR RENDERING DATA INTO A
PRESENTATION FORMAT

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date, October 18, 2000, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EK811355845US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Albert Esquivel
(type or print name of person mailing paper)

Signature of person mailing paper

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.10(b).

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 CFR 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

1. **Type of Application**

   This new application is for a(n)
   <p align="center">(check one applicable item below)</p>

   ☒   Original (nonprovisional)

   ☐   Design
           ☐   Plant

   WARNING: *Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.*

   WARNING: *Do not use this transmittal for the filing of a provisional application.*

   NOTE: *If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.*

   ☐   Divisional.

   ☐   Continuation.

   ☐   Continuation-in-part (C-I-P).

2. **Benefit of Prior U.S. Application(s) (35. U.S.C. 119(e), 120, or 121)**

   NOTE: *If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

   WARNING: *If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). [35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).] For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.*

   WARNING: *When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).*

   ☐   The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. **Papers Enclosed That Are Required for Filing Date under 37 C.F.R. 1.53(b) (Regular) or 37 C.F.R. 1.153 (Design) Application**

       <u> 7 </u>   Pages of specification

       <u> 3 </u>   Pages of claims

       <u> 1 </u>   Page of Abstract

       <u> 3 </u>   Sheets of drawing

                 ☐   formal

                 ☒   informal

(complete the following, if applicable)

☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. 1.84(b).

4. Additional papers enclosed

☐ Preliminary Amendment

☐ Information Disclosure Statement (37 C.F.R. 1.98)

☐ Form PTO-1449

☐ Citations

☐ Declaration of Biological Deposit

☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative

☐ Special Comments

☒ Other: Return Postcard

5. Declaration or oath

☒ Enclosed

Executed by

(check all applicable boxes)

☒ inventor(s).

☐ legal representative of inventor(s). 37 CFR 1.42 or 1.43.

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.

☐ Not Enclosed.

☐ Application is made by a person authorized under 37 CFR 1.41(c) on behalf of **all** the above named inventor(s).

[The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently.]

NOTE: *It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).*

☐ Showing that the filing is authorized.
[not required unless called in question. 37 CFR 1.41(d)]

6. Inventorship Statement

WARNING: *If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.*

The inventorship for all the claims in this application are:

☒ The same.

or

☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted.

☐ will be submitted.

7. Language

NOTE: *An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of $130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).*

NOTE: *A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).*

☒ English
☐ Non-English

☐ The attached translation is a verified translation. 37 CFR 1.52(d).

8. Assignment

☒ An assignment of the invention to Nokia Mobile Phones Limited

☒ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☐ will follow.

NOTE: *"If an assignment is submitted with a new application, send two separate letters–one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).*

WARNING: A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

9. **Certified Copy**

Certified copy(ies) of application(s)

Country   Appln. no.   Filed

Country   Appln. no.   Filed

Country   Appln. no.   Filed

from which priority is claimed

☐   is (are) attached.

☐   will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or
         declaration. 37 CFR 1.55(a) and 1.63.
NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent
         U.S. application or International Application from which this application claims benefit under 35
         U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the
         ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S.
         APPLICATION(S) CLAIMED.

10. **Fee Calculation (37 C.F.R. 1.16)**

A. ☒   Regular application

CLAIMS AS FILED			
Number Filed	Number Extra	Rate	Basic Fee
			37 C.F.R. 1.16(a)
			$710.00
Total Claims [37 CFR 1.16(c)] 23-20 = 3	3	x $18.00	54.00
Independent Claims [37 CFR 1.16(b)] 2-3 = 0	0	x $78.00	0
Multiple dependent claim(s), if any [37 CFR 1.16(d)]	0	+ $260.00	0

☐ Amendment cancelling extra claims is enclosed.

☐ Amendment deleting multiple-dependencies is enclosed.

☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by
         amendment, prior to the expiration of the time period set for response by the Patent and Trademark
         Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation $764.00

B. ☐ Design application
[$310.00—37 CFR 1.16(f)]

Filing Fee Calculation $

C. ☐ Plant application
[$480.00—37 CFR 1.16(g)]

Filing Fee Calculation $

11. Small Entity Statement(s)

☐ Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

WARNING: "Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121 or 365(c) of a prior application may rely on a verified statement filed in the prior application if the nonprovisional application includes a reference to a verified statement filed in the prior application or includes a copy of the verified statement filed in the prior application if status as a small entity is still proper and desired." 37 C.F.R. § 1.28(a).

(complete the following, if applicable)

☐ Status as a small entity was claimed in prior application.

_____/_____, was filed on _____, from which

benefit is being claimed for this application under:

35 U.S.C. ☐ 119(e),

         ☐ 120,

         ☐ 121,

         ☐ 365(c),

and which status as a small entity is still proper and desired.

☐ A copy of the verified statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

$_____

NOTE: Any excess of the full fee paid will be refunded if a verified statement and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendible under § 1.136, 37 CFR 1.28(a).

12. Request for International-Type Search [37 C.F.R. 1.104(d)]

(complete, if applicable)

☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

☐ Not Enclosed

    ☐ No filing fee is to be paid at this time.
       (This and the surcharge required by 37 C.F.R. 1.16(e) can be paid
       subsequently).

☒ Enclosed

    ☒ Filing fee $764.00

    ☐ Recording assignment
        [$40.00; 37 C.F.R. 1.21(h)]
        (See attached "COVER SHEET FOR ASSIGNMENT
        ACCOMPANYING NEW APPLICATION").   _____

    ☐ Petition fee for filing by other than all the inventors or
        person on behalf of the inventor where inventor refused
        to sign or cannot be reached
        [$130.00; 37 C.F.R. 1.47 and 1.17(h)]   _____

    ☐ For processing an application with a specification
        in a non-English language
        [$130.00; 37 C.F.R. 1.52(d) and 1.17(k)]   _____

    ☐ Processing and retention fee
        [$130.00; 37 C.F.R. 1.53(d) and 1.21(l)]   _____

    ☐ Fee for international-type search report
        [$40.00; 37 C.F.R. 1.21(e)]   _____

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application that is abandoned for
         failing to complete the application pursuant to 37 CFR 1.53(d) and this, as well as the changes to
         37 CFR 1.53 and 1.78, indicates that in order to obtain the benefit of a prior U.S. application, either
         the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid,
         within 1 year from notification under § 53(d).

                Total fees enclosed $764.00

14. Method of Payment of Fees

    ☐ Check in the amount of $_____

    ☒ Charge Account No. 50-0270 in the amount of $764.00

    A duplicate of this transmittal is attached.

NOTE: *Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37*
         CFR 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: If no fees are to be paid on filing, the following items should <u>not</u> be completed.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. <u>50-0270</u>.

    ☒ 37 C.F.R. 1.16(a), (f) or (g) (filing fees)

    ☒ 37 C.F.R. 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: *Because additional fee for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency [37 CFR 1.16(d)], it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.*

    ☒ 37 C.F.R. 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

    ☒ 37 C.F.R. 1.17 (application processing fees)

WARNING: While 37 CFR 1.17(a), (b), (c) and (d) deal with extensions of time under § 1.136(a), this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 C.F.R. 1.136(a) is to no avail <u>unless</u> a request or petition for extension is filed." (Emphasis added). Notice of November 5, 1985 (1060 O.G. 27).

    ☐ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: *Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).*

NOTE: *37 CFR 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application...prior to paying, or at the time of paying,...issue fee." From the wording of 37 CFR 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.*

16. Instructions as to Overpayment

    ☒ Credit Account No. <u>50-0270</u>.

    ☐ Refund

Reg. No. 41,242

Tel. No. (972) 894-4959

    [signature]

<u>Signature of Attorney</u>

<u>Milan Patel</u>
(type or print name of attorney)

<u>Nokia Inc.</u>

<u>6000 Connection Drive</u>
(P.O. Address)

<u>Irving, TX   75039</u>

☐ **Incorporation by reference of added pages**

[check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an International Application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.]

☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

<div align="right">Number of pages added _____</div>

☐ Plus Added Pages for Paper Referred to in Item 4 Above

<div align="right">Number of pages added _____</div>

☐ Plus "Assignment Cover Letter Accompanying New Application"

<div align="right">Number of pages added _____</div>

☐ **Statement Where No Further Pages Added**

(if no further pages form a part of this Transmittal, then end this transmittal with this page and check the following item)

☒ This transmittal ends with this page.

METHOD AND APPARATUS FOR CONTENT TRANSFORMATION FOR RENDERING DATA INTO A PRESENTATION FORMAT

FIELD OF INVENTION

The present invention relates to information transformation in a computer system, more particularly, to a system for a content transformation for rendering data into a presentation format.

BACKGROUND OF THE INVENTION

The Internet is operable to communicate content, such data or data document, between clients and servers. The client, via the Internet, accesses the content from one or more servers (for example a web server). There are two kinds of content that may be accessed, static content and dynamic content. Static content generally does not change once it is written. The static content can only be replaced. For example, the content presenting daily news stories can only changes when replaced by other news stories. When the client requests a news story, the web server returns a response, for example, a hypertext markup language (html) page or a deck, containing the requested news story. Dynamic content generally contains fields presenting data which change based upon request. For example, a telephone lookup service, wherein, the client requests a telephone number from the server, the server returns an html page containing the phone number.

The Internet started as a large collection of static content, wherein, the content was provided by organizations publishing information for clients to access. Today static content continues to represent the vast majority of the content available on the Internet.

As the science of the Internet has evolved over the past several years, so has the demand for dynamic content, which provides personalization. Today, there is an increase in the number of servers (or sites) that provide dynamic content. The traditional Internet applications providing dynamic content

generally deal with providing content for a particular client on a device such as a standard computer. Traditionally, the authors of dynamic content providers have been concerned with only two clients, Netscape Navigator™ and Explorer™ by Microsoft. Typically, the content is created statically and unique
5   to each client, thereby creating two copies of the content stored on the server. This poses a problem, especially as the Internet evolved into a wireless communication system having n-number of clients and n-number of devices. Furthermore, each device may have n-number hardware restrictions. Using the traditional approach, the authors (or the developers) of the content would
10   have to create n x n x n number of copies of each content. Managing the dynamic content using the traditional approach is time consuming and provides a slower response to the clients. The authors, therefore, have limited themselves to providing content for common platforms, thereby limiting personalization to certain clients and clients on non-standard devices.

15   It would be useful to have a system that allows the authors to create dynamic content independent of client, and that renders data into a presentation format through several stages and personalizes the content based on the client's device, browser type, and user preferences of the client.

SUMMARY OF INVENTION

20   The present invention advantageously provides a system and an associated method for an n-pass transformation for automatically rendering data into a presentation format based on the client device, browser type, mark-up language employed, or other user preferences.

The present invention encompasses a server, such as a general-purpose
25   computer, in a communication system. The server may be connected to one or more electronic devices representing clients. The invention comprises a method of receiving a request for content from a client and providing the requested content presentable on the client's device. The content is transformed using an n-stage transformation technique, wherein the
30   presentation format is created in one or more stages (passes). In this technique the initial data content is retrieved from the database and then this content is enhanced automatically based on terminal specifics, browser type,

mark-up language employed, spoken language (such as Finnish), user preferences, etc.

A more complete appreciation of all the advantages and scope of the present
5 invention can be obtained from the accompanying drawings, the following detailed description of the invention, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a client-server communication system;

10 FIG. 2 illustrates a content transformation process depiction of an embodiment of the invention; and

FIG. 3 shows flow diagram of the content transformation operating program according to an embodiment of the invention.

DETAIL DESCRIPTION OF THE INVENTION

15 FIG. 1 is a client-server communication system according to an embodiment of the invention, shown generally as 100, that provides for search request by a user of a client device. The communication system 100 generally includes a client 101, a server 108 and a database 112.

In an exemplary implementation of the client-server communication
20 system 100 the client 101 is typically connected to the server 108 via client-sever link 102. The client-server link 102 may comprise a wireless link or an electronic link, such as telephone connection. The client 101 comprises a software program, such as a browser, to allow the user to create and send a content request 104. The client 101 may be a mobile terminal, general-
25 purpose computer, a Personal Digital Assistant (PDA) or other client terminal device having the browser. The server 108 may be a general-purpose computer having a memory and processor. The server 108 may be connected to one or more clients analogous to client 101. The sever 108 comprises plurality of operating programs which receive user's search request, such as the content request 104. The server 108 further comprises
30 multi-stage content transformation operating program 109 for carrying out an

embodiment of the invention. The server 108 is typically connected to the database 112 via a server-database link 110 for retrieving data based on the content request 104 wherein the server-database link 110 may be a wireless or an electronic link. The database 112 may be a general-purpose computer

5   having various memories. It should be noted that methods of retrieving data from the database are well known in the art and will not be discussed in detail herein. It should be also be noted that the multi-stage content transformation operating program 109 may reside at another general purpose computer (not shown), referred to as gateway, which may be coupled the server 108 and

10   client 101 without departing from the invention.

        The client using the browser, creates a content request 104 and requests the sever 108, via the client-server link 104, to provide content. The request reaches the server 108 running a multi-stage content transformation (MPCT) operating program 109. The data is retrieved from the database 112

15   and a presentation response 106 is created and sent to the client 101. However, further processing is performed on the data retrieved 114 from the database 112 by the NPCT operating program 109 to create the presentation response 106 and is sent to the client 101. The presentation response 106 is the final/actual content to be displayed on the client's terminal and may be a

20   Hypertext Markup Language (HTML), Handheld Device Markup Language (HDML), Wireless Markup Language (WML) or other known Markup languages used to display the presentation response 106 on electronic devices.

        FIG. 2 illustrates a preferred embodiment of a multi-stage content

25   transformation process 200. The content is transformed in three stages, a first stage content transformation 222, an intermediate stage content transformation 224 and a final stage content transformation 226. Each stage comprises one or more stage rules (also known as formatting template or stylesheet) defining the layout of a Meta Markup Language (MML) document

30   wherein data is embedded according to rules. In the preferred embodiment, a generic Extensive Stylesheet Language Transformation (XSLT) engine is used to merge (transform) data according to the rules in each stage.

In the first stage 222 the data is retrieved from the database 112. A set of first stage rules 204 are used to merge the retrieved data 114 into a first stage data layout 208 according to the first stage rules 204. The first stage rules 204 are generally defined by using the content request 104. The rules will define how the data is laid out, for example when a telephone number is requested, the actual telephone number will be inserted next to the text presenting the requested telephone. The first stage data layout 208 is a generic layout wherein the retrieved data is inserted according to the first stage rules 204 using a first XSLT engine 206.

The intermediate stage 224 comprises one or more sub-stages that are executed using one or more intermediate rules to further transform first stage data layout 208 to intermediate stage data layout 214. An Intermediate XSLT engine 212, analogous to the first XSLT engine 206, is used to merge first stage data layout 208 and intermediate stage rules 210 for generating the intermediate stage data layout 214. Each rule is merged separately in content transformation sub-stages. When all the rules are merged (or all the sub-stages are executed), the intermediate stage data layout is created. In the preferred embodiment the intermediate stage comprises a browser-type sub-stage using a set of browser-type rules, an internationalization stage using a set of internationalization rules, a user profile stage using a set of user profile rules, and a optimization stage using optimization rules. It should be noted that the number of rules and the type of rules are dependent on the operator of the server. Furthermore, the additional set of rules may be added to the intermediate stage rules or set rules may be deleted from the preferred embodiment without departing from the invention. The set of browser-type rules is used to render data based on the type of browser used by the client 101, such as Netscape™ or Explorer™. The set of internationalization rules are used to create a new MML, wherein, the presentation response 106 may be in a specific language used by the client 101. These rules are used to convert the data into specific language requested by the user of the client 101. The set of user profile rules may be based on the preference of the client's user: such as font, color, graphics, etc. The set of optimization rules is used to optimize, to compress or to encrypt the presentation response 106.

Generic transformation languages may used to define these rules and how the rules are defined is not a limitation of this invention.

The final stage 226 comprises a set of final stage rules 216 used for transforming intermediate data layout 214 into a presentation format 106. A final XSLT engine 218, analogous to first and intermediate XSLT engines 206 and 212, is used to merge intermediate stage data layout 214 and final stage rules 216 to form the presentation response 106. The presentation response 106 may be HTML, HDML or any other language understood by the client 101. In the preferred embodiment, the final stage rules 216 are dynamically generated by the server 108 based type of device as defined the client 101. The content request 104 provides information about the client's device 101, such as the model and make of a mobile phone or the type of PDA. For example if a mobile phone is the client 101, then model number of the phone is provided in the content request. The limitations and template rules for particular mobile phones may be pre-defined and stored in memory of the server 108 for quicker access. The content request 104 may also provide any limitations of devices such as display size, graphics capabilities, memory limitations, etc. The information about the client's device that is provided in the content request 104, is used to dynamically define the final stage rules 216. Once the final stage rules are defined, the intermediate stage data layout is merged to create the presentation response 106, which is then sent the client 101.

FIG. 3 describes a flow diagram of the multi-stage content transformation operating program 109 according to an embodiment of the invention. In a preferred embodiment, the multi-stage content transformation operating program 109 is stored and operated by the server 108. At block 300, the process 109 is initiated upon receiving a content request 104. At block 302, the first stage of the multi-stage content transformation process 200 is executed. At block 304, the data is retrieved from the database 112. At block 306, the first stage rules is defined in accordance to the content request 104. At block 308, the first stage data layout is created by transforming the retrieved data and the first stage rules.

At block 310, the intermediate stage of the multi-stage content transformation process 200 is executed. At block 312, the intermediate data layout is created by using all the intermediate stage rules that are defined by the operator. In the preferred embodiment, a loop is used to cycle through all the intermediate stage rules, block 314 and 316. Each rule is successively merged with the first stage data layout to form the intermediate stage data layout.

At block 320, the final stage of the multi-stage content transformation process 200 is executed. At block 322, the final stage rules are generated using the content request 104. At block 324, the final stage rules are merged with the intermediate stage data layout to form a presentation response 106 which is returned to the client 101.

As examples, the method may also be implemented by incorporating the first stage content transformation and intermediate content transformation into the final content transformation whereby a single stage may be used to provide the presentation response. Furthermore, the method may also be implemented in electronic devices such as PDA, general-purpose computers, mobile phones and other devices having processor and memory. The method and apparatus may be realized by using general computer languages or device specific languages.

Thus, while the invention has been particularly shown and described with respect to preferred embodiments thereof, the above description is intended by way of example only and is not intended to limit the present invention in any way except as set forth in the following claims.
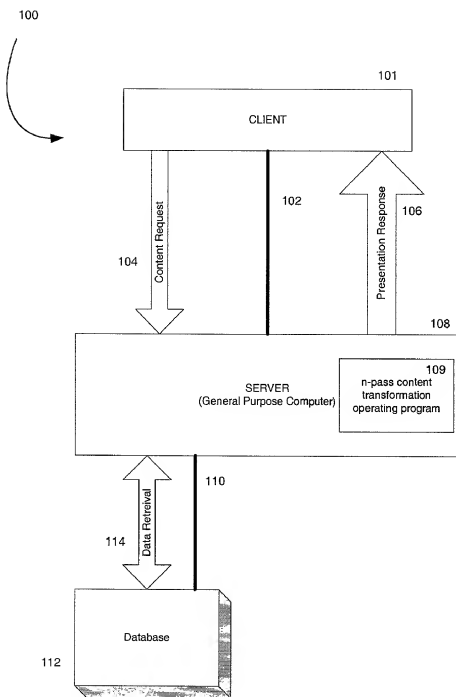
CLAIMS

What is claimed is:

1. A content transformation method operated in a client-server communication system, the method comprising steps of:

    receiving a content request by a server from a client;

    performing a first stage content transformation to generate a first stage data layout based upon said content request;

    performing a intermediate stage content transformation using said first stage data layout to generate a intermediate data layout; and

    performing a final stage content transformation using said intermediate data layout to generate a presentation format based on a device used by said client.

2. The method as recited in claim 1, wherein the step of performing said a first stage content transformation comprises the step of retrieving data from a database.

3. The method as recited in claim 2, wherein the step of performing a first stage content transformation further comprises the step of defining a set of first stage rules.

4. The method as recited in claim 3, wherein the step of performing a first stage content transformation further comprises step of generating said first stage data layout by transforming said data using said first stage rules.

5. The method as recited in claim 2, the step of performing an intermediate stage content transformation comprises step of performing one or more sub-stages to generate said intermediate stage data layout.

6. The method as recited in claim 5, wherein the step of performing one or more sub-stages comprises a step of performing a browser-type stage using a set of browser-type rules.

7. The method as recited in claim 5, wherein the step of performing one or more sub-stages comprises a step of performing an internationalization stage using a set of internationalization rules.

8. The method as recited in claim 5, wherein the step of performing one or more sub-stages comprises a step of performing a user profile stage using a set of user profile rules.

9. The method as recited in claim 5, wherein the step of performing one or more sub-stages comprises a step of performing an optimization stage using a set of optimization rules.

10. The method as recited in claim 1, wherein the step of performing a final stage content transformation comprises a step of defining a set of final stage rules.

11. The method as recited in claim 10, wherein the step of defining a set of final stage rules comprises a step of using said content request to define the final stage rules.

12. The method as recited in claim 1, wherein the content transformation is XSLT based content transformation using XSLT engine.

13. A server in a client-server communication system, the server comprising;

a content transformation operating program wherein the operating program comprising the steps of:

receiving a content request by a server from a client;

performing a first stage content transformation to generate a first stage data layout based upon said content request;

performing a intermediate stage content transformation using said first stage data layout to generate a intermediate data layout; and

performing a final stage content transformation using said intermediate data layout to generate a presentation format based on a device used by said client.

14. The server according to claim 13, wherein the step of performing a first stage content transformation, further comprises the step of retrieving data from a database.

15. The server according to claim 14, wherein the step of performing a first stage content transformation, further comprises the step of defining a set of first stage rules.

16. The server according to claim 15, wherein the step of performing a first stage content transformation further comprises step of generating said first stage data layout by transforming said data using said first stage rules.

17. The server according to claim 13, the step of performing an intermediate stage content transformation comprises step of performing one or more sub-stages to generate said intermediate stage data layout.

18. The server according to claim 17, wherein the step of performing one or more sub-stages comprises a step of performing a browser-type stage using a set of browser-type rules.

19. The server according to claim 17, wherein the step of performing one or more sub-stages comprises a step of performing an internationalization stage using a set of internationalization rules.

20. The server according to claim 17, wherein the step of performing one or more sub-stages comprises a step of performing a user profile stage using a set of user profile rules.

21. The server according to claim 17, wherein the step of performing one or more sub-stages comprises a step of performing an optimization stage using a set of optimization rules.

22. The server according to claim 13, wherein the step of performing a final stage content transformation comprises a step of defining a set of final stage rules.

23. The server according to claim 22, wherein the step of defining a set of final stage rules comprises a step of using said content request to define the final stage rules.

ABSTRACT

The present invention encompasses a method in a client-server communication system wherein the method comprises one or more stages for content transformation, which renders data into presentation format. The method comprises at least stage for content transformation that is based on device used by the client.

100

101

CLIENT

104 ⟷ Content Request

102

Presentation Response

106

108

SERVER
(General Purpose Computer)

109
n-pass content
transformation
operating program

110

114 ⟷ Data Retrieval

112

Database

FIG. 1

200

114 Retrieved Data

204 First stage rules

206 First stage XSLT Engine

208 First stage data layout

210 Intermediate stage rules

212 Intermediate stage XSLT Engine

214 Intermediate stage data layout

216 Final stage rules

218 Final stage XSLT Engine

106 Presentation Response

222 First Stage

224 Intermediate Passes

226 Final Pass

FIG. 2

300

MULTI-STAGE CONTENT
TRANSFORMATION OPERATING PROGRAM

302

FIRST STAGE

304

RETRIEVE DATA

306

DEFINE FIRST STAGE RULES

308

CREATE FIRST STAGE DATA LAYOUT

310

INTERMEDIATE STAGE

312

CREATE INTERMEDIATE STAGE
LAYOUT

LOOP UNTIL ALL
THE INTERMEDIATE
STAGE RULES

314

EXIT WHEN ALL THE
RULES HAVE BEEN
APPLIED

316

320

FINAL STAGE

322

DEFINE FINAL STAGE RULES
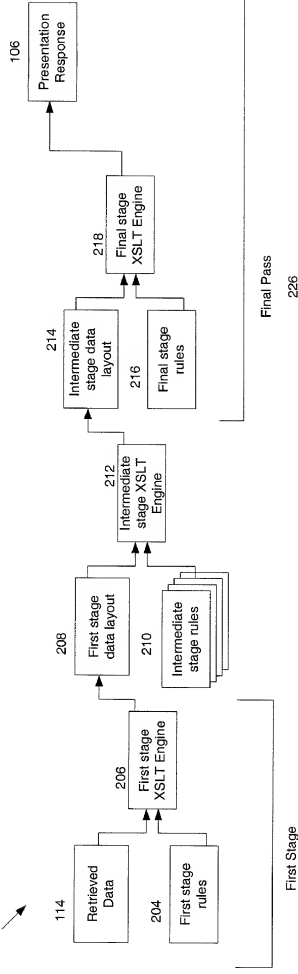
324

CREATE AND SEND THE PRESENTION
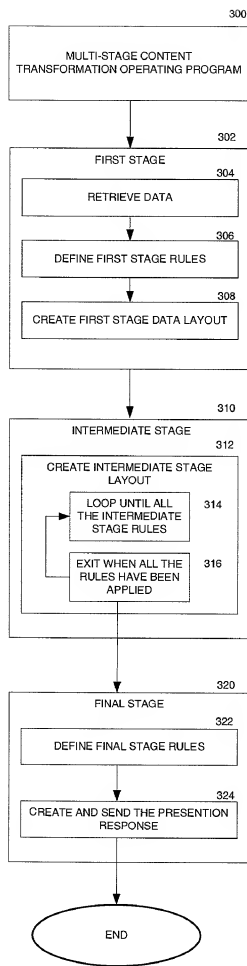RESPONSE

END

FIG. 3

COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type:

(check one applicable item below)

☒ original.

☐ design.

☐ supplemental.

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

☐ national stage of PCT.

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

☐ divisional.

☐ continuation.

☐ continuation-in-part (C-I-P).

INVENTORSHIP IDENTIFICATION

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below next to my name. I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

—

METHOD AND APPARATUS FOR CONTENT TRANSFORMATION FOR RENDERING DATA INTO A PRESENTATION FORMAT

—

SPECIFICATION IDENTIFICATION

the specification of which: [complete (a), (b) or (c)]

(a) ☒ is attached hereto.
(b) ☐ was filed on _____ as ☐ Serial No. _____/
      or ☐ Express Mail No., as Serial No. not yet known
      and was amended on _____ (if applicable).

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not
       accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are
       those filed with the application papers or, in the case of a supplemental declaration, are those amendments
       claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

(c) ☐ was described and claimed in PCT International Application No. _____ filed on
      and as amended under PCT Article 19 on _____(if any).

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56,

(check the following items, if desired)

☒ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

☐ in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 CFR 1.98.

PRIORITY CLAIM [35 U.S.C. § 119(a)–(d)]

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)–(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

[complete (d) or (e)]

(d) ☒ no such applications have been filed.

(e) ☐ such applications have been filed as follows.

NOTE: *Where item (c) is entered above and the International Application which designated the U.S. itself claimed
       priority check item (e), enter the details below and make the priority claim.*

**PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119(a)–(d)**

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, **month**, year)	PRIORITY CLAIMED UNDER 37 USC 119
			☐ YES NO☐
			☐ YES NO☐
			☐ YES NO☐
			☐ YES NO☐
			☐ YES NO☐

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)
[35 U.S.C. § 119(e)]

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER   FILING DATE

_____   _____

_____   _____

_____   _____

CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S)
UNDER 35 U.S.C. 120

☐   The claim for the benefit of any such applications is set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART (C-I-P) APPLICATION.

**ALL FOREIGN APPLICATION(S), IF ANY, FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

_____

_____

_____

_____

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming
        the basis for this application entering the United States as (1) the national stage, or (2) a continuation,
        divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION
        AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit
        of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and
transact all business in the Patent and Trademark Office connected therewith. *(List name and
registration number)*

Brian T. Rivers	41,270
Paul R. Juhasz	36,345
Robert C. Rolnik	37,995
Jerald J. Gnuschke	42,588
Allen Scott Lineberry	44,873
Milan Patel	41,242

(check the following item, if applicable)

☐   Attached as part of this declaration and power of attorney is the authorization
    of the above-named attorney(s) to accept and follow instructions from my
    representative(s).

_____

SEND CORRESPONDENCE TO   DIRECT TELEPHONE CALLS TO:
Nokia Inc.   *(Name and telephone number)*
Attn: Brian T. Rivers, Esq.
6000 Connection Drive   Brian T. Rivers
Irving, TX   75039   (972) 894-4959

_____

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all
statements made on information and belief are believed to be true; and further that these
statements were made with the knowledge that willful false statements and the like so made are
punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United
States Code, and that such willful false statements may jeopardize the validity of the application
or any patent issued thereon.

SIGNATURE(S)

Full name of sole or first inventor

Leon _____ _____ Thrane _____
(GIVEN NAME)   (Middle Initial or Name)   Family or Last Name)

Inventor's Signature: _____

Date: _____   Country of Citizenship: Danish _____

Residence ____ Woburn, MA _____

Post Office Address ____ 3 Kimball Ct., #602 _____

_____ Woburn, MA 01801 _____

Full name of second joint inventor, if any

_____ _____ _____
(GIVEN NAME)   (Middle Initial or Name)   Family or Last Name)

Inventor's Signature: _____

Date: _____   Country of Citizenship   _____

Residence _____

Post Office Address _____

_____

Full name of third joint inventor, if any

_____ _____ _____
(GIVEN NAME)   (Middle Initial or Name)   Family or Last Name)

Inventor's Signature: _____

Date: _____   Country of Citizenship: _____

Residence _____

Post Office Address _____

_____

[check proper box(es) for any of the following added page(s)
which form a part of this declaration]

☐   Signature for fourth and subsequent joint inventors. *Number of pages added*

· · ·

☐   Signature by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added*

· · ·

☐   Signature for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. *Number of pages added*

· · ·

☐   Added page for signature by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time (37 CFR 1.47). *Number of pages added*

· · ·

☐   Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.
                   ☐ Number of pages added

· · ·

☐   Authorization of attorney(s) to accept and follow instructions from representative. *Number of pages added*

· · ·

(If no further pages form a part of this Declaration,
then end this Declaration with this page and check the following item:)

☒ This declaration ends with this page.